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AGAINST IDEALISM IN PHYSICS

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Even before World War II certain Soviet physicists took it upon themselves, with an enthusiasm worthy of a better cause, to popularize and develop the most reactionary concepts of foreign quantum theoreticians.

Thus, for example, Professor Ya. I. Frenkel, in his book, Wave Mechanics explained the fundamentals of the theory of atomic structure. Each electron, according to Frenkel, exists not in one form only, but simultaneously in a large number of "states." These states, writes Frenkel, fill space in such a way that their number is not only infinite, but is also incomputable. The relative density of the probability of an electron being in any given position in this space. How can this be understood? It appears that one supermimute electron is present, which like God, simultaneously is all parts of the given space. In this way we force the world of physics to enter the world of mysticism.

"There is no point," we read in the textbook of physics for universities, published in 1947, "in attempting to define the position of an electron more accurately than is permitted by the limits of determinacy. It is reasonable only to inquire as to what is the probability of an electron being in one or another location in the atomic orbit, since it is distributed in space."

"The very nature of matter," says the author of another university textbook, Atomic Physics (1934), Professor E. Shpolsky, "imposes limitations of accuracy in the location of electrons."

Can we not speak of some limit in the localization of the charge, mass and energy of an electron? The present-day form of the micromechanical equation gives the possibility of calculating only the "probability" of a microparticle being in any given location. This is evidence of the compromise character of quantum theory in its present stage of development.

Equally unconvincing are the contentions of the "physical idealists" who claim that observation by means of instruments cause displacement of the microparticles from their locations, thus making it impossible to define the position of a given particle both in space and in time.

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But the very reaction between the particle and the instrument takes place in space and in time. Hence, at any instant, before, after or at the moment of reaction, the charge (and also the mass and the energy) of the particle should possess a completely defined and precise location in time and in space. And since space and time are infinite in all directions, there can be no limitations to the localization, to any desired degree of accuracy, of micro-objects. To deny this would be equivalent to rejecting the objective reality of space and time as basic conditions of the existence of all matter.

In 1947, such a theoretical 'salto mortale' was achieved in the pages of the journal "Problems of Philosophy," by Professor M. Markov. His paper has already been decisively condemned by all progressive Soviet physicists and philosophers.

There are, however, some who agree with Markov. The first issue of "Scientific Publications (Series of Philosophic Sciences) Leningrad University, 1947, contains a paper by Docent V. Svidersky: "Two Trends in Modern Atomic Physics on the Problem of Space and Time."

Which two trends has the writer in mind? It is natural that the reader should expect from a paper approved by the physical faculty of one of our biggest universities a Marxist-Leninist analysis on party line of these two undoubtedly important decisive trends, the protagonists of which have joined battle in the world of theoretical physics. The question at issue is the problem of full and unrestricted cognizance of the state of existence of atomic particles in space and in time. But Svidersky's article does not even attempt to analyze this controversy. Instead we find a purely objective review of foreign opinions, including the utterances of even the most insignificant and contemptible bourgeois formal mathematical authors.

Having bowed down before the leaders of the Copenhagen bourgeois-physical school, who are in principle opposed to materialism, the authors, Markov and Svidersky, adopt the camouflage customary on such occasions: they cover their ideas with a cloak of Marxist and dialetical terminology.

But to no purpose. This maneuver will be unmasked. Soviet scientists will also discern the well-concealed reality, and harmful nature, of the idealistic views of this theoretical school and its troubadours. The essence of their teaching lies in so-called "mathematical formalism" and "symbolism."

The real nature of mathematical formalism in physics was revealed 40 years ago by the genius of V. I. Lenin in his article, "Matter Disappears, Only Equations Remain." The unrelenting battle against reactionary idealism and formalism is today being waged in our country on all sectors of the cultural front. Idealism and formalism signify deviation hindering the progress of science. Idealistic and formalistic concepts in the theory of the atom are nothing other than restrictive concepts.

"A complete, closed theory," giving very nearly ideal harmony between theory and properly devised experiment, is claimed for quantum mechanics by Professor Markov in Problems of Philosophy, (No 2, p 167, 1947.). The thesis asserting that macroscopic terminology is incapable of expressing the laws of microphenomena is, according to Markov, fundamental, i.e., all attempts at further extending and consolidating the theory of atomic structure, with the object of dispelling the fog of "indeterminacy" are predestined to failure. A similar veto was first imposed on materialistic physics by the organizers of the Atomics Congress at Como. For 20 years the Copenhagen scientists and their servile Soviet supporters have kept the atomic theory within the tight corset of "complete" and "closed" quantum mechanical description.

The recent gigantic achievements of physics in the domain of release of atomic energy, of study of cosmic rays, etc., have been attained not because of, but in spite of, modern physical theory. These advances were achieved

chiefly by trial-and-error methods, as is admitted by all of the more eminent modern experimental physicists.

The conclusions emerging from the above are clear to all Soviet physicists. Quantum physics must be liberated from its state of indeterminacy, and should enter on the path of precise and unambiguous description of the phenomena of the atomic world. To this end, we must eradicate physical idealism, we must do away with the agnostic view that indefiniteness and uncertainty are indissolubly bound up with the behavior of atomic particles and we must further develop the quantum theory, in spite of the belief of idealistic physicists and their apologists that this theory is complete and closed.

Only the scientists of the Soviet Socialist State who are guided by the great principles of dialectical materialism can bring back the theory of the structure of matter from the false path into which it has been led by idealistic physicists of all shades.

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